

FIG.2B

7 7 8 9

Nucleotide sequence of plasmid pMP44

1020 1080 1200 1260 380 440 140 .320 500 720 780 840 900 960 180 240 360 420 480 540 009 099 ccatgcctcc cgtatgttcc acttccctac gaacgcggat ccctttggc ccttatgcta accactcccc caactatctc tattttaca acacagtaca gtgttccgga tacggtaaac ttgacgtcaa tttggcagta accccattga gtcgtaacaa atataagcag ttgacctcca ctgagagtgc atcagattgg aatcaattac cggtaaatgg tcagcgggtg ttggctcatg gagacggtc tcaataatga ccaagtctcc ccacgctgtt cggtgcattg tataggcaca accccgctt accattattg ctctttgcca Ţ tacatttata gtggagtatt acgccccta accttatggg gtgatgcggt tttccaaaat tgggaggtct acggactctg O O gcagattgta aaaataccgc tattaatagt acataactta tcagggcgcg gcagctcccg acaacgccg tctcgggta agccctggt gggcctatac tgggttattg cataacatgg tccacgcgaa tccacatccg acggggattt gagacgccat cggccgggaa ctatagactc agagactgac cacatataca cggcatcaga tcataatatg attgactagt gttccgcgtt cccattgacg tatgccaagt ccagtacatg tattaccatg tcaacgggac gcgtgtacgg gacaagcccg gcgtaaggag acgtcaatgg tctgacaca gcgtgggatc ggtttgactc attactaatc tatgtaatta cggcggagct catatatgga aagtgtatca ggcattatgc ggcaccaaaa taagtaccgc ttttggcttg cctataggtg tttacaaatt ggtgaaaacc gccgggagca cttaactatg ccgcacagat tgtatccata gacattgatt acgacccccg cttccattg tagtcatcgc tgggcggtag agatcgcctg ccagcctccg gatactttcc atgccaatac ccatttatta attaaacata gcagtacatc cgtggatagc ttgacgcaaa gtgaaccgtc cgggaccgat aagagtgacg gctatactgt tatagcttag tctccggtag cggtgatgac gtaagcggat tcggggctgg gtgtgaaata ttgcatacgt ccgccatgtt gttcatagcc tgaccgccca ccaataggga tggcccgcct atctacgtat agtttgtttt tattggctat ggatggggtc cgcagttttt catgggctct gacggtaaa catcaatggg cgtcaatggg ctccgcccca tccccgtgcc taggtgatgg tattggtgac cagcttgtct ttggcgggtg accatatgcg ctattggcca tccaacatta ggggtcatta cccgcctggc atagtaacg tgcccacttg ttggcagtac agctcgttta tagaagacac tcttatgcat tagagagtt

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2160 2640 2700 2760 2820 3060 860 920 2040 2100 2220 2280 2340 2400 2460 2520 2580 2880 2940 3000 800 980 0 62 68 74 12 cttcagcaca atataaattc tcatcctgcc actctgagtc atgccagagc aactggcagc tgcagaccgt tcacgtgtcg caacatcgct ggtaactccc gggtcttttc ttctactctg attgtaagta acgactcact cgatggccgc agaaggcatt cactcatctt actgcgtatg acttaggcac ttttcgctat gaatgggaag agctcctggg acgccaaaag gtatgtgtct taaggcagcg tgctgccgcg cgttaaact tatttgtcag ttatattgta atatttctgc atcctggtca aagtctttgc gaccatgcaa gacaaagaca cacaaatacc ಹ atcaccgacc catacagacg \mathcal{O} tgttcttct 4 ttttcctac gacatacacg taaccaccca tggaggccag tggcggtagg atggaagact aagagtcaga gtgttgttta ttctttcact aggataaaa cagtactcg gtaactttt gaattgtaa tacgcaaag gtacatgca tcctttcca gctcgatagc cttttgcctg ataattttgt tcagggtata tgaattatta tttggcaaa gcggatgtgt cgcgagagat cccattcatc cacaccaaat gcaggagact gatgtctacg cgcaggaaaa gtgtatgct aacagactgt gacccttgat ttcattttct cacttttgtt ataaggtaga aaacaactac gtttgagatg gtattctgat ctcctaacag cacaaggccg gctgacgcag gtagtctgag agttttcagg tgtctcatca aattgatcga acccgaaag atagagagat aatctcctac tataccagga cagctccttg ctgacagact gaggggcaa ttattttctt tttttaaatt ttcaaggcaa taattaaatg ttattggtag gatatacact accatgttca cgtcgacatg acctccgcta aggctgacag cattgcaggt cagtgtgccg ctgagttgtt ggagggcagt tgagtttggg gaccctcatg ggctcgcacg ccaggagaa ccagacgctg ىب ggaaatattc tggttacaat gttattgtgc ttgtcaccgt agctcctgcc gaggtggagt ctggctacca agcgcagaag aaggtgctgg gaagtggccg O ttgtaacgaa tcactttttt acaattgtta ccctctgcta gttgatattg agtgcgcctt ggtcgctcgg ccaccaccac Ø atgcaggcag gacataatag aacttcaggg atgttatatg b gtggagatt tgttaacgg tatcaccat ttgtctcct tagggcgaa ccgtcgttc tttcgcac cctatgcgc acggcagcc gttttagaga ttctcttta aaaccgggc aacgtgctg ttttgttcc aaagtgcat ggatatcggc ggcctccggg catggctacg gcggctcat agcacaatgc gaaaatgagc cagaagaag gttgcggtgc cgcgccacca gatcctgag gtaaaattc atgtcccttg ttgacaacca agcttgcat cttctctaa ggctggcgt

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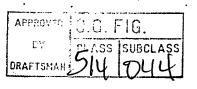
4140 3300 3420 3540 3600 3660 720 780 3840 3900 3960 4020 4080 4200 4260 4320 4380 4440 4500 4560 4620 680 4740 480 324 agttaatacc ctctagcaga acggatatga tcagagctga agagagagga aattcgccta acactgtcaa tagtgggatt tgaagaacta aggcagacct gcttgtgggc caatagtgaa ggttggaggc agacgggagt tggaaacacc attacgtagt aagctttgag tcatgttctc acttaccctc tcgtatcatg aaacggtagg gtgatcaaat acaccacccc gggccgacga agggaagact gcctcgcaa tataccata actaacacga agggaataca gcaggggtcg ctactaggaa cccgtgcacc cctgagtttc aacaggaaac tgctgcgtca attgggtttg tgcgacacag aggagctggc ctgtacggta aagaccacag tcaaccatct acttgctgct gacacccaga tggtctacag accaagcgag gagaaggaga dadacadadad taccaggtcg tacgagaaag D gccacaaact tccttgactg tgcgatacca cagaagttgt ccgttccat cattccggtc cccgagccta cgtccccatc gaacgacgta caagttggcc ggccggcggt ggagttcgtc cgaggagaac agataaaaa accaacccc ctacgtcccc acagcgaaac gaggtcactt ggccaagaag tgaacaagag tcacgcaggt tccaacctac attgaaacct gtgccccggc cctagtgtgc ggaggacgca caagtgggcg caagaaacca ggcgtattgg gtgtgcagca aaagctactg tacctgtagg acgtcacacc taccaccct aactagagta gtggatcggc acaacgaaag gaacaccga ctgtatgcac acggaagaac tcgcatttag gtgtccgaga acaccatgta cgttcgtcat ccagggatgc ccgcacagcc tcaagagctc ataacgggag tgttcgacgt gtgtcagaac caggcgcgta gcaagaagca ctgagagcag agatgctttt gggagagc acataggac aacaatcct cggagggat aaatcacta cagaccgtgc ggaccgtcgc gcgatgaaag tccattctcc acattgtaca gtagttaaga gtctcattcc aggaagatgc agagaagcct ttgaaagtca ataataacac ctactaccat actatggtgt gccgagtacg tggtgttgg gacgcgctag caggccagga ctgaaaggta acgtatcacg ctagcgaccg atagttgtga attgtggccg aaacctctgg gagtttaact tcacgcatta gcgtcgtcag gacgttgaag aggagaaaga cccagtcaga cggcagggtc cgagagcgcc gccgttcac agaactgac gtttatgttt ggtaggatct cgtattccac tgaagggtac tctgcttccg atttaaaacg ggtgccttca gttctcgac gagctgact gtcgacgtc ctgtccccg caggtgaaa gtaccatcag gcaggtgtta cggcaaactg gtacgccgtg gactggcata gaatcagagg tgatgatgaa tcgcagcgcg agcgtcggg

5340 5700 5760 5820 5400 5520 5580 5640 5880 5940 6180 5280 5460 0009 0909 6120 6240 6300 4860 4980 5100 5160 5220 4920 5040 agcaggcagt acctggcttt ataggtgcta ttgtgaacat tgaagctgca atgcccctgc ttacggccac tggtgcctgt attacgagaa caacagctgc ctatcaaccg gggttgagtg acgatctggt agcaccgcgg gtcgtgccgt aagtatgtca cgttgcacta acaccacagg gggcaaagca agggcctcac gaccggctgc ttacagcatt ಹ gagtctttgg ggaaaacgc tggccctaa aatgcggat ccaagtact catacgggca aatgtaattc aaaggcagta agtgagtaca gcagcatctc aatcccttgt gtgattgaag gcgaaaagcc agcaccataa gaaatttgca gtgtccctgt ttcaatgccg gacttggtct gaccacgcca atcgtgtcta ataatcatag ttccgaggct aggctggtgt cagggtaact acaggcgccg gtgaccaaac gacgtgaaga aacgggtgtc ggtactctgc gaccccaagc atctgcactg acagtagtag cggcaggttc caagacggtt gctgaatgtc gcagtgtgtc caacaaaccc gatgtatgga ggggcagtgg tgtgctggac cctgctggtg gttatgcgga agtcacggcc gttaacatgc catgacagca cactgaggat ggccttgaat atataagact taagagcctc aatagttaac catcctgcta ttgccattcc caaccacaac ggtgaatgaa aaacattcca aataatgaag cgtgtgttgg agaggagtgg tgccccgaag ccttcctgaa aaccgctttc ggttgtcacc cggctgacgc aggtcctatc ctccagtggt gcctgttttc tggctgagta ggtaccacgt accactacca cgtcggcacc ctgctattat actgccagga acagtgactc aggetttege gcaaagtggt aggtgaactt gcacgcgtcc ccaacccgtg gagacatcgt gacacgaagt taaggcagaa tgctgacgcg aacacgacaa acaaagcgaa gattgacagc ctggtggaag gccggaatca gataacagac gctagacata agaaaatcc aaagtaagag agggtcactt ttaggactgc ttcagaatcc gtgaatgtac ർ tggcaagaag gcgttccaga agagcttact ctggacagtg cacgccctgg aagatcaggc tcaggcaagt aagaaggaga agtagggaaa tatgtggacg aaacctcgga atgcagctta tccagacgtt atgcgcacga cccaagccag gactaccgtg gtatacgccg ccctggatt tggagttgac gcctcgacgc cgacctaagt attggaagaa taaggaggac caaccactgg caggctggaa tatcgcagaa caggctgccg gctggtcaat cgaagggctg ggttccggga caccagcggc gaaggggaca ggacatccta gctcttgtt cttcaatatg taaaagtata cggaggcaag acagaccaag gctgcagttg ccgcaaaggg gtcggagcac ggccggcgat gcctgtggac cctggacact cacacgga

7200 7260 7320 7380 7800 7860 0969 7020 7080 7140 7440 7500 7560 7620 7680 7740 920 980 0999 6720 6780 6840 0069 6540 0099 gcgagaaggt ccgcatctac ccgactcgtc tcgagaaccc cggagcgacc acaagctgcc tcaatgatga tgggtcgtaa aattcaacca aggcaaacga aatgtccggt tggtttgctc tcgactcgat ccgcaggcat gagttaagag cccgtggaac ttaagggagc tcatccacgc tggccgctgt ccatcccgct acaaaagttg agctgagtgc tcaaccatct agttctcgtc gctacgcaa tgagagett tgatgttat cacctgaac catgtggacc ggcatcttga tcgtaccccg cagcaatccc tactgcagag gtggagttgc gaaggtacga atcagatcca aaaagcatgg aaggtaaagt D gactggacca tcgtgtgaca tcccgcgcgg ಹ gaagtgttct atgaatacca ccatcctaca gcagctaacg ccgtcagcct agcagcctgg agactgcaag tgcctgtgcc ttaagcagaa agcagcgtag gaccgcgaa cggaagtat gcgtttagg accccagac ataccttgcc ggctgacgta acaccaagtt cagtttgcag ccaaggact cgtgaccatc gaggacggct gcacccggac ctcgtacttt gttgtggccc aatggacaac gacagtgccc tggggtgcag ggttagtccg gtttgacttg tgtttcctcc cagcaataca cgggtgtgca tgtggttaac catgtgcggc agcggaaggg actgtcactg agataggctg aaaacccggc gctacaccag gaagaaatgg O accatgtaga tgtcgctacc tgcaccctga agagagctgc cgacgcctgc cggacgctga gccttaggtc taccttcagt cgttacgagg tagtagtgac gcgaagccgt gaccetetae ttaaaacagt ccacgactga aagtaaacag ccattgacat ggtcgctgta agatactgac tgggcgaaac cacctcccag tacgactgct attgtgtcac tgcacacggc cagaagcggc gggccgtggc gcggcggaag tggtgagagi gacccgacgg agcgatacca tggctccca gcggcagatg ccgcgcccga ccgagaaagc ctatacgcgc gattcatcaa cggatcgccc ctcccgaaat ggagatgcgc gtgggcacaa ggagtgttca accacagact gataaaatca ttgagaaagg aacggaaaga Q gccacgtgca ggcgtatgca aatttctctg gtggccgccg atggacgcca atccaggaag accactgacg gatatggcag tcagatcgg ggagaagcc . d acagatatgc gaacgattcc gacagcagaa ctcctgttc acggaccac tccactgcc atctttccc ctacgagcca cgcggacctg attecteca ggtgccggcg gatgcttggg cggatacgcc tgcaagagtg caactttgac cgtgtatgcc agcagacata tgtaggggat agcaacacca tgtagcgcct ctaccgggca gctgtccaca attcacagca ggagaagaaa cgtggagctg gggctacagt ggctgctatt

FIG. S

9120 9180 8760 8820 8880 8880 9900 9240 8100 8220 8280 8340 8400 8460 8520 8580 8640 8700 9300 040 8160 360 420 480 009 φ φ gataccagtc acagaaaat atgaatacga cattctgccc tacgcagtgc ccaagagaaa tcaacgtgga cgaaagctgc tggacagatt cagaggaaag tgtgcggcat tggctcttac tgatcgaggc agttcggagc tcatcggcga agtgcgcaca agagggegaa gggccagatt cagcgtgcaa aacaacctat acacattgtt gcgcgtcgtg D ggattactt tataatagg acatcacca caggagacc ttttt cata ctcacatcgg gacagagcga cagccgactg gcggccgcca ttgaaaggcc gaggttccca accgcttacc cctaacgtgc cacttccacc gacgactcct ctgctggact acgcgcttca actgttttga tgtgcggcct gcggagaggt ttggcctccg O Q \mathcal{O} gttcggtacc gtagcaatcg cagataacag tcggcagtgt gaatatgcta acgaaacaca aataagagt gcatatatt cacaatctc ttggatact gaaaaaccc accaactggc caccatggac atattgggaa gtttattaac caagctgatg ggtggacagg aagccccgat ggcgtcgtac tagttgcttg tgcgtaccac gaacgtgcta tgtgaccaaa tccgctgcag cactccaggg gccattggcg tgtgttacgc catcgcctct caaaagccag ggatcagtac tgactccgcc gtcatgggc ggtcgatgcg ccgcgcgggt cgttaggcag cccgccaaaa atcggaggct aacatacgcg agaaaatgta agatgcaccc aagccacggt acgggtcgga cgaaacatca acacactaca gctccggaga tcactaccta aagcagcgga ttgacgcgat catcattcga atctaggggt agagactcac tgatctccga Ö acgagcacga tgcgactagg gccgcatacc aaagattctc acccaacagt gagaactacc acaacttggt atgtcaaagt gactaaatgc gctgtcacc ttctgactt cattgacg aacaaaat gaggtgaaga gacgacgtcc ggacatttac gtccaggagg ctgaaaatgc gagaacatga gcggacgtag accgtgatcg tccagaaatt gacatggttg cggtgctacc ccctttcaga acgcaaatgc actgagaaca gctaagaccc caggtaattc ttagtaagga gccgaagact acggacattg atcctcgaag gaaatatcca tcgggcatgt gtactggagc gttcacggag ggcgactttg cgctatgcct atgaaacgag cggagacttc tttgacgttc cactggcagc actggatgcg gtactccct gaataccta gcatacttg ggcgaagctc cggataacc gccttgttc acggtcgac cccaaagtc aggtttaatg agcctttggg atgatgaaa gacaacatc gctgttgctg cgcaaagtg gtacacggga gtcccgtca tgcaacgtc gtgcttcaag ccacagggaa tgatatgtcg ggttctagag \mathcal{D} agcaagcagg gtcaacat



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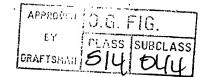
12360 12420 2480 2540 12600 12660 12720 2780 11460 .1580 1640 11700 11760 1820 1880 1940 12000 .2060 12120 12180 .2240 2300 $\tilde{\infty}$ aaaacgcagc gggtggtctg tgggctccgc tgacacatta ttttattt aaaaaaaaa cggatggcta ttgcccctcc ataaaatgag ggtggggcag ggtgggctct aagcaggca ctctgatgaa atttattcgt tatcatgact gccactccgg agcgccgtaa ccaaagaaga aaaagagaaa cagtaacgta agaaaagtt aacaagacct taaaagtctc caaacgtttt atccaataaa taaagggatg atggcatct D ctggggatgc cacgtccact catctgttgt tcctttccta tggggggtgg gggccagaaa gcaactcatc gcctcccaaa cggctagcca agaaaatctc نــ aattgaaaac aacaaagcgc caactcatat ർ aaaaaaaa O aatgtacagc O \mathcal{O} ccaccacaaa catccctacg gccgttgcag gatcaacgga gaaacccgga atgtatcaaa agcaagaagg tcacttgca aataattgg gcgggtcgg tagtattcc agagcctag agttgccagc actcccactg cattctattc agcaggcatg tcttcgtatg tataacttgt aaactcgggg taattcgacg aaaaaaaa aaaaaacta aaggaggacg gttcctcct aagattaacc ctcctgctag agaagaagaa tcatgggtgc ctggttgtgg atagcaagaa ggcaaaacta gggtgcgatt tatgacccat gctggtaaat aattgaatta cccgtccttg agcagatgca agcccaagaa tatgtaaata ggaaggtgcc gagtaggtgt gaattgaccc ccgaaaacgc caagccgaca aatgactgta caccgcacta tatcctggtg tacataagct tattccaaa aaaaaaaaa tgggcatccg tgtgccttct gtcatgctat aataaatttc ccgggtaatt cdcccddcdd ttccaggccc aacgcaattg accataactg cgcctcacgg attttctaac cacattatat agtcaacgag taatgtaaat ggaagacaa tggcattga ccagatctgc ccccgtggtc attggaagct tggtttttaa aaaaaaaa cggtccgacc ccttgaccct cgcattgtct ggaggattg ggtgctgaa gagccattgt gatccagatc cgtccccgac caatcggcgc gggtaggcaa atggcatata tcataaagac gtgaaccaat caatatctca aattattaca gtggcgcccg aatgagacag caaaccaaag gaaagacaag gaagattgaa acatgtcggg ctgtaggtaa മ cccgtgcctt gataagtta gggtaagca gcgcaattgg ttggcaata ttttgcaat aaaaaaaaa cacctcctcg agggagagat gaaattgcat acatctctag gacactgtgt ttgatgcat ggctcccgt atgcgctgac agaagacaac gtgtttccag ggggccttcg gacagcaagg tgggtaccc aatcgtggaa tatgtaaaag aaatccgatg tgataatgag acggccgccg agcaaaagaa aatgtgcat ൯

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Anti-RSV F titres in sera from mice taken 4 weeks after priming and 2 weeks after boosting

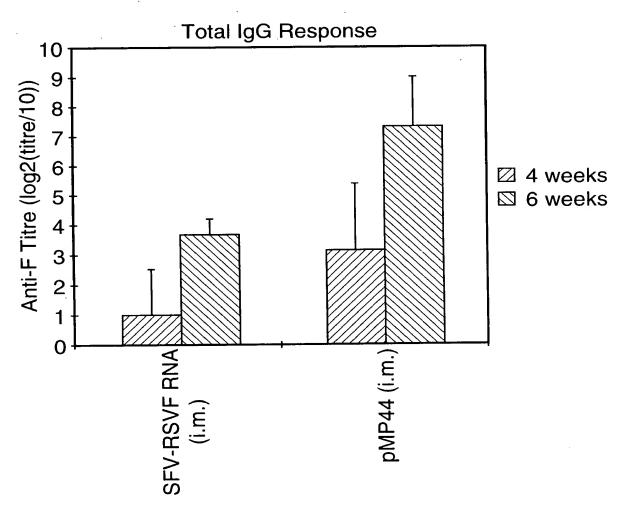


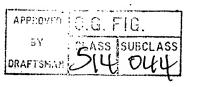
FIG.4

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Ribozyme linker for pMP42

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FIG.5



gtgtcgtacg ccatctgtga cccagacaat ggtttgacac gctggcactt ataccatcgt acggtaaaac ccacagacac agttgttagt acacgatgaa aatacaaggc gctgctgctt aataccactg ccgacctgca cagacgtcac atgcaccaac caaactgggc tgactgaggg acacagtca. caaagaaac ribozyme gtgtgcaaga gtcccctcaa gacgcacaga cgaaacacta tgggcgaggg tcacttactt aaaccagaca gcagcatcct aaaccttgcg ctactgagga tgtaggtgcg cccggcctgt ggaaaaatca tgcctgcata tatgctgtac tattggattg acctacgcca tctacgcaca gatagctacg t 0 ligated catgtacaag cgaaaggctc agagatcgca tcctaccttt ccaggacgtg cagaacggcg cgcgtatcca gaagcaattg gagcagaaag atcctttacc cactatgtgc gggattccta atgcacctac cacaccggag aagaacacag atttagcaag ccgagagagg gagaatgatg aggactgtgt fragment atcacgcgga ctctgggtgt agatgcacac cgccttccag cagaagaccc tgctggatag acgctgaatc tggccgtata tgtacactga aaggtaaaca cattccctgt cgaccgacgt ttgtgaacgg tggccgtcgc tgaaaggtgt cgctagcagg ccaggaacat ttctccgcaa ttaagaaaat RV-Spe gggtacgtag gccgtgacgt ggcatactag cagaggatag cttccgattg aaaacgagga atcggcagtg tgcgcagcg ccgggaagg ctacgccag atcaggcga gtgttacagg aaactgtcca ggatctacat ttccacctga aaagagtct gatgaaaaac cagccgaag atgtttgacg SFV Eco

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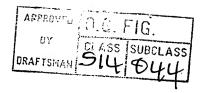
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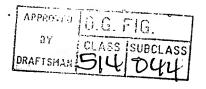
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